

CLAIMS

1. A method for polishing a substrate including at least one metal layer comprising the steps of:
 - a. preparing a polishing composition having and abrasive, at least one oxidizer, and from about 0.1 to 5.0 wt % of a complexing agent wherein the slurry does not include a film-forming agent;
 - b. applying the chemical mechanical polishing slurry to the substrate; and
 - c. removing at least a portion of the metal layer from the substrate by bringing a pad into contact with the substrate and moving the pad in relation to the substrate.
2. The method of claim 1 wherein the polishing composition complexing agent is selected from the group consisting of citric acid, lactic acid, tartaric acid, succinic acid, acetic acid, malonic acid, oxalic acid, amino acids, amino sulfuric acids, salts thereof, and mixtures thereof.
3. The method of claim 1 wherein the polishing composition complexing agent is present in an amount ranging from 0.5 to about 3.0 wt. %.
4. The method of claim 1 wherein the polishing composition oxidizer is a compound that forms hydroxyl radicals upon reduction.
5. The method of claim 1 wherein the polishing composition oxidizing agent is hydrogen peroxide.
6. The method of claim 1 wherein the oxidizing agent is present in the polishing composition in an amount ranging from about 0.3 to about 17 wt. %.
7. The method of claim 1 wherein the weight ratio of oxidizing agent to complexing agent in the polishing composition ranges from about 2 to about 16.67.
8. The method of claim 1 wherein the polishing composition has a pH of from about 5 to about 9.
9. The method of claim 1 wherein the polishing composition abrasive is at least one metal oxide.

10. The method of claim 1 wherein the polishing slurry abrasive is selected from the group consisting of silica, alumina, and mixtures thereof.
11. The method of claim 10 wherein the polishing slurry abrasive is colloidal silica.
12. The method of claim 10 wherein the polishing slurry abrasive is fumed alumina.
13. The method of claim 1 wherein the polishing slurry includes at least one surfactant.
14. The method of claim 1 wherein the polishing slurry abrasive consists of discrete, individual metal oxide spheres having a primary particle diameter less than 0.4 micron and a surface area ranging from about 10 m²/g to about 250 m²/g.
15. The method of claim 1 wherein the abrasive is selected from the group consisting of precipitated abrasives or fumed abrasives.
16. The method of claim 1 wherein the polishing slurry includes an abrasive, an oxidizing agent, and from about 0.1 to about 5.0 wt. % tartaric acid.
17. The method of claim 1 wherein the polishing slurry includes from about 1.0 to about 15.0 wt. % of an abrasive selected from silica, alumina and mixtures thereof, from about 1.0 to about 12.0 wt. % hydrogen peroxide; and from about 0.1 to about 5.0 wt. % tartaric acid.
18. The method of claim 17 wherein the weight ratio of hydrogen peroxide to tartaric acid in the polishing slurry ranges from about 2 to about 7.14.
19. The method of claim 17 wherein the polishing slurry abrasive is selected from the group consisting of colloidal silica and fumed alumina.